Grades 9–12

3.5.9-12.FF Technology and Engineering: Integration of Knowledge, Technologies, and Practices

Students who demonstrate understanding can *evaluate how technology enhances opportunities for new products and services through globalization.*

Clarifying Statement: Developing countries have in many cases bypassed telephone landlines in adopting cellular technology, which has been used not just for communication but also to complete a variety of other tasks, such as banking. This concept is referred to as late-comer advantage. The exponential growth curve of technology has led to innovations and advancements once thought unattainable. Advancements and cost reduction of technologies such as rapid prototyping, desktop CNC, and microcontrollers have provided opportunities for new and innovative product ideas.

Assessment Boundary: N/A

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Technology and Engineering Practices (TEP)
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. • Compare, integrate and evaluate sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a scientific question or solve a problem.	**Engineering Design** • Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	**Optimism** • Shows persistence in addressing technological problems and finding solutions to those problems.

Pennsylvania Context: N/A

Pennsylvania Career Ready Skills: Establish pro-social relationships to support self and others.

Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
PA Core Standards: Reading and Writing in Science and Technical Areas	CC.1.2.3.G: Use information gained from text features to demonstrate understanding of a text. CC.1.2.4.G: Interpret various presentations of information within a text or digital source and explain how the information contributes to an understanding of text in which it appears. CC.1.2.5.G: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. CC.1.4.3.V: Conduct short research projects that build knowledge about a topic. CC.1.4.4.V: Conduct short research projects that build knowledge through investigation of different aspects of a topic. CC.1.4.5.V: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. CC.1.4.3.W: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. CC.1.4.4.W: Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. CC.1.4.5.W: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
PA Core Standards and Practices: Math	MP.3: Construct viable arguments and critique the reasoning of others.
Integrated Standards for Science, Environment & Ecology, and Technology & Engineering Standards Grades K–12	N/A